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**A METHOD FOR ON-BOARD DIAGNOSIS OF COLD START  
EMISSIONS REDUCTION CONTROL STRATEGY**

**ABSTRACT OF THE DISCLOSURE**

A method and control system for verifying cold start emissions reduction control in a vehicle using an internal combustion engine utilizes measured engine speed and commanded ignition timing to

5 calculate an estimated actual engine-out thermal energy flow. An expected thermal energy flow is calculated based on designed engine speed and ignition timing. A residual energy flow is calculated based on a difference between the estimated actual thermal energy flow and the expected thermal energy flow. Meanwhile, a system quality-

10 weighting factor is calculated based on several measured engine parameters. A qualified energy flow residual is calculated based on the system quality weight and the residual energy flow. The qualified energy residual flow is accumulated, averaged based on the accumulated quality weight, and then filtered. Diagnostic control

15 determines that if the cold start emissions reduction control is operating correctly based on the filtered averaged qualified energy flow residual comparing a predetermined range.